

REMARKS

Claims 1-29, all the claims pending in the application, stand rejected on prior art grounds. Claims 1, 11, and 21 are amended herein. Applicants respectfully traverse the rejections based on the following discussion.

I. The Prior Art Rejections

Claims 1-29 stand rejected under 35 U.S.C. §102(e) as being anticipated by Mathew et al. (U.S. Publication No. 2005/0098822), hereinafter referred to as "Mathew". Applicants respectfully traverse these rejections based on the following discussion.

Mathew teaches a transistor formed having three separately controllable gates. The three gate regions may be electrically biased differently and the gate regions may have different conductivity properties. The dielectrics on the channel sidewall may be different than the dielectrics on the top of the channel. Electrical contacts to the source and drain and the three gates is selectively made. By including charge storage layers, such as nanoclusters, adjacent the transistor channel and controlling the charge storage layers via the three gate regions, both volatile and non-volatile memory cells are realized using the same process to create a universal memory process. When implemented as a volatile cell, the height of the transistor and the characteristics of channel sidewall dielectrics control the memory retention characteristics. When implemented as a nonvolatile cell, the width of the transistor and the characteristics of the overlying channel dielectrics control the memory retention characteristics.

However, the claimed invention, as provided in amended independent claims 1, 11, and 21 contain features, which are patentably distinguishable from the prior art references of record. Specifically, claim 1 recites, in part, "...a gate layer positioned on top of and contacting said fin

structure, said spacers, and said insulator." Additionally, claim 11 recites, in part, "...a third gate electrode positioned on top of and contacting said fin structure, said first gate electrode, and said second gate electrode." Likewise, claim 21 recites, in part, "...depositing a third gate electrode on top of and contacting said fin structure, said first gate electrode, and said second gate electrode." These features are clearly provided in Applicants' FIGS. 3 through 12(b), as originally filed.

With respect to Applicants' independent claim 1, in Mathew (see FIGS. 5 and 6), the gate layer (18) is clearly not on top of and contacting the fin structure (14 & 16), the spacers (42 & 44), and the insulator (66). In fact, in Mathew the gate layer (18) is structurally isolated from the spacers (42 & 44) and the insulator (66) due to oxide layer (28) (see also paragraph [0019] in Mathew which describes the function of oxide layer (28) as providing isolation for the gate layer (18) from contact with other surfaces). Also, the gate layer (18) is not on top of the insulator (66) as clearly shown in FIG. 6 in Mathew, but rather the insulator (66) surrounds the gate layer (18) and extends above and below gate layer (18). Therefore, Mathew is missing several elements of Applicants' independent claim 1, and as such Applicants' independent claim 1 and dependent claims 2-10 through dependency are patentable over Mathew.

Even if gates 42 or 44 in Mathew are considered to be the "first gate electrode", then neither of these gates contacts and is on top of the insulator (66), contrary to the Applicants' claimed invention. Additionally, in Mathew (see FIGS. 4 and 5) the gate electrode (42) is clearly not positioned on top of the fin structure (14 & 16), gate electrode (18), and the gate electrode (44), contrary to the Applicants' claimed invention. If Mathew is interpreted such that gate electrode (18) is the "third gate electrode", then gates (42 & 44) are the second and third gate electrodes (or vice versa). In such an interpretation, while gate electrode (18) is positioned on

top of the fin structure (14 & 16), it is not, however, positioned on top of the gate electrodes 42, 44 (as shown in FIG. 5 of Mathew, there is no structure on top of gates 42, 44).

With respect to Applicants' independent claims 11 and 21, Mathew does not teach "a third gate electrode positioned on top of and contacting said fin structure, said first gate electrode, and said second gate electrode" as does the Applicants' independent claims 11 and 21. In fact, pages 4 through 7 of the Office Action apparently contains a contradictory statement regarding the purported teachings of Mathew as it relates to Applicants' independent claims 11 and 21.

Specifically, taking the rejection of independent claim 11 as an example (the rejection of independent claim 21 is virtually the same) page 4 of the Office Action characterizes Mathew's fin structure as elements 14 & 16 and the first gate electrode as element 42. Page 5 of the Office Action characterizes Mathew's gate insulator as element 16, the second gate electrode as element 44, and third gate electrode as element 18. However, the Office Action states on page 5 that "a second gate electrode (44; Para. 0021) positioned transverse to said first gate electrode (18)." This is contradictory to what is stated on page 4 of the Office Action that the first gate electrode is element 42 and not element 18. Then, page 5 of the Office Action states that the third gate electrode is element 18. There appears to be a disconnect between what the Office Action is characterizing as the first, second, and third gate electrodes of Mathew. Clearly, gate electrode 42 in Mathew is not positioned transverse to gate electrode 44 as FIGS. 4-6 of Mathew clearly demonstrate.

If the Office Action actually is interpreting Mathew such that gate layer 18 is the first gate electrode and gates 42 and 44 are the second (42) and third (44) gate electrodes, then clearly the third gate (44) is not positioned on top of the fin structure (14 & 16), the first gate electrode

(18), and the second gate electrode (42). If the Office Action actually is interpreting Mathew such that gate layer 18 is the first gate electrode and gates 42 and 44 are the second (44) and third (42) gate electrodes, then clearly the third gate (42) is not positioned on top of the fin structure (14 & 16), the first gate electrode (18), and the second gate electrode (44).

If the Office Action actually is interpreting Mathew such that gate 42 is the first gate electrode, gate 18 is the second electrode, and gate 44 is the third electrode, then the third gate electrode 44 is clearly not on top of and contacting the fin structure (14 & 16), the first gate electrode 42, and the second gate electrode 18. Moreover, if the Office Action is interpreting Mathew such that gate 44 is the first gate electrode, gate 18 is the second electrode, and gate 42 is the third electrode, then the third gate electrode 42 is clearly not on top of and contacting the fin structure (14 & 16), the first gate electrode 44, and the second gate electrode 18.

Furthermore, if the Office Action is interpreting Mathew such that gate 42 is the first gate electrode, gate 44 is the second electrode, and gate 18 is the third electrode, then the second gate electrode 44 is clearly not positioned transverse to the first gate electrode 42. Additionally, if the Office Action is interpreting Mathew such that gate 44 is the first gate electrode, gate 42 is the second electrode, and gate 18 is the third electrode, then the second gate electrode 42 is clearly not positioned transverse to the first gate electrode 44.

Thus, irrespective of how Mathew is interpreted (i.e. gate 18 is the first, second, or third electrode; or gate 42 is the first, second, or third electrode, or gate 44 is the first, second, or third electrode), it does not teach the elements of the Applicants' independent claims 11 and 21. A similar mischaracterization exists on pages 6 and 7 of the Office Action with respect to independent claim 21. Therefore, Mathew is missing several elements of Applicants' independent claims 11 and 21, and as such Applicants' independent claim 11 and dependent

claims 12-20 through dependency and independent claim 21 and dependent claims 22-29 through dependency are patentable over Mathew.

For clarification, in the Applicants' claimed invention, and particularly in independent claim 11 (with reference to Applicants' FIGS. 3 through 12(b)), a FET device 100 comprises a fin structure 170; a first gate electrode 145 adjacent to said fin structure 170; a gate insulator 160 positioned between said first gate electrode 145 and said fin structure 170; a second gate electrode 140 positioned transverse to said first gate electrode 145; and a third gate electrode 130 positioned on top of said fin structure 170, said first gate electrode 145, and said second gate electrode 140.

Furthermore, in the Applicants' claimed invention, and particularly in independent claim 21 (with reference to Applicants' FIGS. 3 through 13), a method of lowering a gate capacitance and extrinsic resistance in a FET 100 comprises forming (205) a fin structure 170; configuring (207) a first gate electrode 145 contacting said fin structure 170; disposing (209) a gate insulator 160 between said first gate electrode 145 and said fin structure 170; positioning (211) a second gate electrode 140 transverse to said first gate electrode 145; and depositing (213) a third gate electrode 130 on top of said fin structure 170, said first gate electrode 145, and said second gate electrode 140. Therefore, Applicants' claims 11-29 are patentably distinct from Mathew irrespective of how Mathew is interpreted.

In view of the foregoing, the Applicants respectfully submit that the cited prior art reference, Mathew, does not teach or suggest the features defined by amended independent claims 1, 11, and 21 and as such, claims 1, 11, and 21 are patentable over Mathew. Further, dependent claims 2-10, 12-20, and 22-29 are similarly patentable over Mathew, not only by virtue of their dependency from patentable independent claims, respectively, but also by virtue of

the additional features of the invention they define. Furthermore, the Applicants note that all claims are properly supported in the specification and accompanying drawings. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejections.

II. Formal Matters and Conclusion

With respect to the rejections to the claims, the claims have been amended, above, to overcome these rejections. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejections to the claims.

In view of the foregoing, Applicants submit that claims 1-29, all the claims presently pending in the application, are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary. Please charge any deficiencies and credit any overpayments to Attorney's Deposit Account Number 09-0456.

Respectfully submitted,



Mohammad S. Rahman
Registration No. 43,029

Dated: February 27, 2006

Gibb I.P. Law Firm, LLC
2568-A Riva Road, Suite 304
Annapolis, MD 21401
Voice: (301) 261-8625
Fax: (301) 261-8825
Customer Number: 29154